
Call for Suggestions: 2007 LWS TR&T Focused Science Topics

From: Tamas Gombosi <tamas at engin.umich.edu>

On behalf of the NASA LWS TR&T Steering Committee (TSC) I would like to invite recommendations for 2007 focused science topics.

Since the TR&T program, and LWS as a whole, are required to produce science with a demonstrable impact on society, the TR&T is a directed program with well-conceived "targets" that are defined and updated on a regular and systematic basis. The TSC is in the process of selecting the most important and timely scientific targets for the 2007 ROSES competition. At the end of the process the TSC will recommend about 10 focused science topics to the LWS Program Scientist, who will select approximately 5 or 6 for the 2007 ROSES.

The TSC has compiled a preliminary list of suggested focused science topics and it is seeking feedback and additional suggestions from the space physics community. Please send your suggestions and comments to Tamas Gombosi, Chair of the LWS TR&T Steering Committee (tamas@umich.edu).
If you suggest additional focused science topics, please include a short title, a one paragraph description, and a sentence about the expected expertise of the focus group members.

We are trying to make the process of recommending new focused science topics as transparent as possible, therefore we are planning to make a summary of the suggestions available to the entire community.

The preliminary list of suggested focused science topics is the following:

1. Determine the flows in the solar interior, and their effect on flux transport mechanisms and on predicting the solar cycle.
2. Bridging the gap between photospheric field measurements and the coronal models which use them.
3. Determine the conditions leading to CME/eruptive flare onset.
4. Vertical coupling among regions of the sun-earth system, and responses to solar forcing.
5. Origin and evolution of the suprathermal seed population and its effects on large gradual SEP events.
6. Develop the capability to simulate transients on global heliospheric scales to understand and predict the short and long-term variability of GCRs.
7. Global Understanding of the GCR Modulation and Propagation in the Heliosphere and their effect in Space Weather.

8. Develop understanding of the factors that affect predictability of plasma and energetic particle energy transport between the solar surface and the Earth.
9. Physical Processes in the Formation and Evolution of Shocks in the Solar Wind from Sun-Earth.
10. Location and rate of magnetic reconnection on Earth's magnetopause.
11. Given a solar energetic particle event, predict the distribution of these particles throughout the magnetosphere.
12. Quantify the relative importance of different fundamental processes responsible for electron acceleration in the inner magnetosphere.
13. Quantification of the competition between acceleration and loss of relativistic electrons in the radiation belts.
14. High fidelity models of the dynamic, global and self-consistent magnetic and electric fields in the inner magnetosphere
15. Self-consistent modeling of wave growth and their effects on particles.
16. Understand the strong storm-time response of the magnetosphere-ionosphere coupling at high latitudes.
17. Investigate persistent, significant modifications of the middle and low latitude thermosphere/ionosphere system during the recovery phase of intense geomagnetic storms.
18. Investigate the sources, effects, and variability of thermospheric winds.
19. Coupling and connections among the neutral and ionized thermospheric densities and winds, and responses to solar forcing.
20. Regional responses of the climate and atmosphere to solar forcing.
21. Mechanisms by which variations in solar spectral irradiance affect climate.
22. Investigate the processes (and associated uncertainties) by which ice-core records of various kinds indicate past variations in solar activity distinctly.
23. Responses of natural variability modes within the earth's atmosphere to solar forcing.
24. Comparative assessment of terrestrial responses to photon-driven versus particle/plasma driven solar energy input changes.

Please send me your feedback by December 8, 2006.

Tamas Gombosi (tamas@umich.edu)
Chair, NASA LWS TR&T Steering Committee